

5 What is claimed is:

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1. An active water compatible energy curable composition comprising a water compatible compound; a maleimide derivative; and water.

10 2. The energy curable composition of Claim 1 wherein said water compatible compound is selected from the group consisting of acrylate resins; methacrylate resins; acrylic dispersions; urethane resins; vinyl alcohols such as ethylene vinyl alcohol and ethylene vinyl alcohol; vinyl alcohol
15 copolymers such as ethylene vinyl alcohol copolymer; polysaccharides; polysucrose; and glucose.

3. The energy curable composition of Claim 1 further comprising a compound copolymerizable with the said maleimide derivative and water compatible compound.

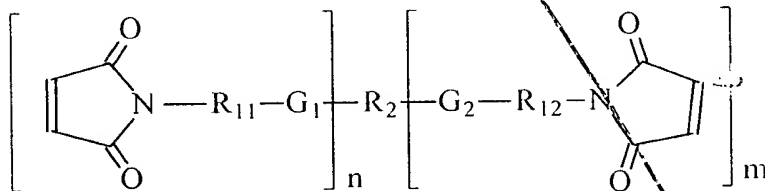
20 4. The energy curable composition of Claim 3 wherein said copolymerizable compound comprises at least one compound selected from the group consisting of a compound having at least one group selected from an acryloyloxy group and methacryloyloxy group, and a compound having vinyl ether
25 group.

5. The energy curable composition of Claim 4 wherein said compound having at least one group selected from an acryloyloxy group and methacryloyloxy group comprises at least one compound selected from (poly)ester (meth)acrylate, urethane (meth)acrylate, epoxy (meth)acrylate, (poly)ether (meth)acrylate, at least one compound selected from the group
30 consisting of an alkyl (meth) acrylate, an alkylene (meth)acrylate, a (meth)acrylate having aromatic group, and a (meth)acrylate having alicyclic group.

35 6. The energy curable composition of Claim 5 wherein said compound having vinyl ether group comprises at least one compound selected from the group consisting of an alkyl vinyl ether having a terminal group substituted with at least one

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cont. 5 selected from the group consisting of a hydrogen atom, a halogen atom, a hydroxyl group, and an amino group, a cycloalkyl vinyl ether having a terminal group substituted with at least one selected from the group consisting of a hydrogen atom, a halogen atom, a hydroxyl group, and an amino group, and at least one vinyl ether selected from the group consisting of a monovinyl ether, a divinyl ether, and a polyvinyl ether in which a vinyl ether group is connected with an alkylene group; and in which a vinyl ether group is connected with at least one group with and without substituent selected from the group consisting of alkyl group, cycloalkyl group, and aromatic group, via at least one linkage selected from the group consisting of an ether linkage, an urethane linkage, and an ester linkage.

7. An active water compatible energy curable composition comprising a water compatible compound; water; and a maleimide derivative of the formula:



wherein n and m each independently represent an integer of 1 to 5, and the total of m and n is 6 or smaller;

R₁₁ and R₁₂ each independently represent a linking group selected from the group consisting of an alkylene group, an alicyclic group, an arylalkylene group, and a cycloalkylalkylene group;

G₁ and G₂ each represent an ester linkage selected from the group consisting of -COO- and -OCO-;

and R₂ represents a linking chain having an average molecular weight of 100 to 100,000 selected from the group

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cont.

5 consisting of a (poly)ether or (poly)ester linking chain, in
which at least one organic group consists of a group or groups
selected from a straight or branched chain alkylene group, an
alkylene group having a hydroxyl group, an alicyclic group, an
aryl group, an arylalkylene group, and a cycloalkylalkylene
10 group connected via at least one linkage selected from the
group consisting of an ether or ester linkage.

8. The energy curable composition of Claim 7 wherein
 R_2 is a (poly)ether linking chain having an average molecular
weight of 100 to 100,000, and comprised of repeating units
15 containing at least one group selected from a C_2 - C_{24} straight
or branched chain alkylene group, a C_2 - C_{24} alkylene group
having a hydroxyl group, and a C_6 - C_{24} aryl group.

9. The energy curable composition of Claim 8 wherein
 R_2 is comprised of repeating units containing at least one
20 group selected from a C_2 - C_{24} straight or branched chain
alkylene group or a C_2 - C_{24} alkylene group having a hydroxyl
group.

10. The energy curable composition of Claim 7 wherein
 R_2 is a (poly)ester linking chain having an average molecular
weight of 100 to 100,000, and comprised of repeating units
25 containing at least one group selected from a C_2 - C_{24} straight
or branched chain alkylene group, a C_2 - C_{24} alkylene group
having a hydroxyl group, and C_6 - C_{24} aryl group.

11. The energy curable composition of Claim 9 wherein
30 R_2 is comprised of repeating units containing at least one
group selected from a C_2 - C_{24} straight or branched chain
alkylene group or a C_2 - C_{24} alkylene group having a hydroxyl
group.

12. The energy curable composition of Claim 7 wherein
35 said water compatible compound is selected from the group
consisting of acrylate resins; methacrylate resins; acrylic
dispersions; urethane resins; vinyl alcohols such as ethylene
vinyl alcohol and ethylene vinyl alcohol; vinyl alcohol

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5 copolymers such as ethylene vinyl alcohol copolymer; polysaccharides; polysucrose; and glucose.

13. The energy curable composition of Claim 7 wherein said water compatible compound is a resin selected from the group consisting of acrylate and urethane resins.

10 14. The energy curable composition of Claim 13 wherein said acrylate resin is aliphatic epoxy acrylate.

15. The energy curable composition of Claim 13 wherein said resin urethane resin is aliphatic urethane acrylate.

15 16. The energy curable composition of Claim 7 further comprising a compound copolymerizable with the said maleimide derivative and water compatible compound.

17. The energy curable composition of Claim 16 wherein said copolymerizable compound comprises at least one compound selected from the group consisting of a compound having at least one group selected from an acryloyloxy group and methacryloyloxy group, and a compound having vinyl ether group.

18. The energy curable composition of Claim 17 wherein said compound having at least one group selected from an acryloyloxy group and methacryloyloxy group comprises at least one compound selected from (poly)ester (meth)acrylate, urethane (meth)acrylate, epoxy (meth)acrylate, (poly)ether (meth)acrylate, at least one compound selected from the group consisting of an alkyl (meth) acrylate, an alkylene (meth)acrylate, a (meth)acrylate having aromatic group, and a (meth)acrylate having alicyclic group.

19. The energy curable composition of Claim 17 wherein said compound having vinyl ether group comprises at least one compound selected from the group consisting of an alkyl vinyl ether having a terminal group substituted with at least one selected from the group consisting of a hydrogen atom, a halogen atom, a hydroxyl group, and an amino group, a cycloalkyl vinyl ether having a terminal group substituted

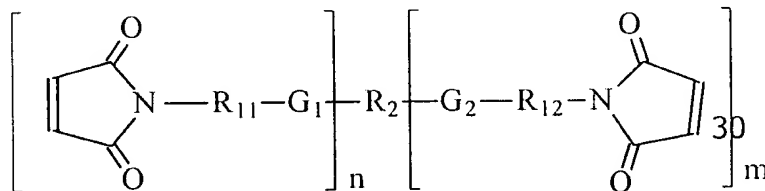
with at least one selected from the group consisting of a hydrogen atom, a halogen atom, a hydroxyl group, and an amino group, and at least one vinyl ether selected from the group consisting of a monovinyl ether, a divinyl ether, and a polyvinyl ether in which a vinyl ether group is connected with alkylene group; and in which a vinyl ether group is connected with at least one group with and without substituent selected from the group consisting of alkyl group, cycloalkyl group, and aromatic group, via at least one linkage selected from the group consisting of an ether linkage, an urethane linkage, and an ester linkage.

20. A printing ink or coating comprising the active water compatible energy curable composition of Claim 1

21. A printing ink or coating comprising the active water compatible energy curable composition of Claim 7.

22. A method for curing an active water compatible energy curable composition which comprises: irradiating an active energy curable composition consisting of a water compatible compound, water and a maleimide derivative.

23. The method according to Claim 22 wherein said maleimide derivative is of the formula:



wherein n and m each independently represent an integer of 1 to 5, and the total of m and n is 6 or smaller;

R₁₁ and R₁₂ each independently represent a linking group selected from the group consisting of an alkylene group, an alicyclic group, an arylalkylene group, and a cycloalkylalkylene group;

5 G₁ and G₂ each represent an ester linkage selected from the group consisting of -COO- and -OCO-;

 and R₂ represents a linking chain having an average molecular weight of 100 to 100,000 selected from the group consisting of a (poly)ether or (poly)ester linking chain, in
10 which at least one organic group selected from straight or branched chain alkylene group, straight or branched chain alkylene group having a hydroxyl group, alicyclic group, aryl group, arylalkylene group, and a cycloalkylalkylene group connected via at least one linkage selected from the group
15 consisting of an ether or ester linkage.

24. The method according to Claim 23 wherein said water compatible compound is selected from the group consisting of acrylate resins; methacrylate resins; acrylic dispersions; urethane resins; vinyl alcohols such as ethylene vinyl alcohol and ethylene vinyl alcohol; vinyl alcohol copolymers such as ethylene vinyl alcohol copolymer; polysaccharides; polysucrose; and glucose.

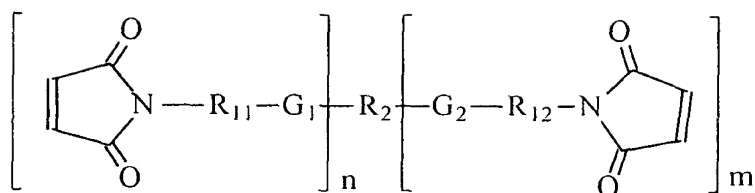
25. The method according to Claim 22 wherein the need to dry the energy curable composition prior to irradiation is eliminated.

26. The method according to Claim 22 wherein the need to dry the energy curable composition after irradiation is eliminated.

27. The method according to Claim 23 wherein R₂ of the
30 maleimide derivative is a (poly)ether or (poly)ester linking chain, having a molecular weight of greater than 200.

28. The method according to Claim 24 further comprising adding a compound copolymerizable with the said maleimide derivative and water compatible compound.

35 29. An active energy curable composition comprising a maleimide derivative of the formula:



wherein n and m each independently represent an integer of 1 to 5, and the total of m and n is 6 or smaller;

R₁₁ and R₁₂ each independently represent a linking group selected from the group consisting of an alkylene group, an alicyclic group, an arylalkylene group, and a cycloalkylalkylene group;

G₁ and G₂ each represent an ester linkage selected from the group consisting of -COO- and -OCO-; and

R₂ is selected from the group consisting of a (poly)ether or (poly)ester linking chain, in which at least one organic group selected from straight or branched chain alkylene group, straight or branched chain alkylene group having a hydroxyl group, alicyclic group, aryl group, arylalkylene group, and a cycloalkylalkylene group connected via at least one linkage selected from the group consisting of an ether or ester linkage, having a molecular weight of greater than 200.

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